

Memorandum

To: Peter Geddes

From: Protected Areas Branch, DEL

Date: December 23rd, 2007

Re: Touquoy Gold Project (DDV Gold Ltd) Focus Report

After submission and review of the environmental assessment report for the proposed Touquoy Gold Project, the proponent, DDV Gold Ltd., was asked by the Minister to provide further information in a Focus Report. The proponent was asked to examine the environmental risks posed by the mining and processing of gold on the recreational, wilderness, and ecological values of the Scraggy Lake, Fish River, and Moose River system, and undeveloped lands lying south-west of the project site. The Focus Report Study Area (FRSA) includes, the Tangier Grand Lake Wilderness Area and the area containing the recently announced candidate Ship Harbour-Long Lake Wilderness Area.

Wilderness areas in Nova Scotia provide substantial contributions to the legislated goal of protecting 12% of the land base by the year 2015. Typically they are relatively small in size compared to others established in the larger provinces and territories. This is due to the highly fragmented pattern of property ownership and land use in the province, which also produces narrow limits of compatibility between resource-based projects and ecological and recreational values. Establishing protected areas in Nova Scotia is a complicated process and requires years of work to succeed in conserving the remnants of province's wild spaces and biodiversity. Hence a primary impetus for the Touquoy Focus Report is to assess the perceived threat to nearby wilderness values and the Tangier Grand Lake Wilderness Area.

The Protected Areas Branch staff have reviewed the Focus Report and submit the following general and specific comments concerning effluent and aquatic habitat; species at risk; wetland; air emissions, monitoring, noise, light and visual impacts.

General Comments

The Mineral Policy of Nova Scotia (1996) clearly recognizes that mineral extraction and processing will produce environmental disturbances. These include environmental effects that occur on- and off-site. The proposed development of the Touquoy Project is an open-pit gold mine (4500 t/day) located in Halifax County and lying in the vicinity of the Tangier Grand Lake Protected Wilderness Area and adjacent to the Ship Harbour-Long Lake Candidate Wilderness Area.

To varying degrees, the proponent has considered the concerns cited in the TOR. Despite the much improved public consultation process and proposals for numerous

monitoring and mitigation measures, there are significant residual environmental impacts resulting from this project and the integrity of the Candidate Wilderness Area is considered to be at risk. The report does not provide adequate assurances that significant residual environmental effects will not extend beyond the property boundaries, into the adjacent Candidate Wilderness Area and downstream habitat. The evidence in the report identifies permanent and long term environmental costs, such as net loss of wildlife habitat, reduced biodiversity, destruction of rare species habitat, destruction of wetland ecosystems, degraded water quality and fish habitat, all of which are discordant with protected area objectives. In addition, the proposed levels of ambient noise, light and visual impacts will reduce the quality of wilderness recreation values and experience.

The Focus Report is comprehensive in many aspects and provides good coverage of the study area. However, there are areas still lacking sufficient data for establishing certainty in decision-making. Although the assessments of noise, light and visual impacts is more comprehensive than seen in any other mining EA, the report tends to devalue many of the residual impacts regarding wilderness recreation values.

There are five significant issues that arise from the proposed project with respect to protected areas and related ecological and recreational values.

- Risk to aquatic ecosystems - effluent is predicted to exceed CCME guidelines in some toxins
- Destruction of 1 red listed and 4 yellow listed species
- Destruction of 5 wetlands
- Continued uncertainty in effects of air emissions on rare lichens
- The effect of noise, light and visual impacts on wilderness values

Effluent

The report acknowledges that effluent exceeding CCME guidelines will be discharged off site, which will move through the major waterways of the FRSA, including the candidate wilderness area. The Canadian Water Quality Guidelines for the protection of aquatic life are predicted to be exceeded for aluminum, arsenic, and copper all through the Fish River system to Lake Charlotte. Iron and cadmium are exceeded in Scraggy Lake. Even with tertiary wetland treatment many of the toxins will exceed the guidelines. The background levels of many of these toxins are already high, likely due to contamination from past gold mining activity and local geochemistry, so the ecosystems are more sensitive to the cumulative effects of further pollution. Furthermore, the plan to deal with historic tailings does not provide much detail nor certainty regarding the integrity of the containment cell over the long-term, which could become a source of toxic seepage over time.

- All effluent leaving the treatment area should be required to meet CCME guidelines.
- The management plan for containing historic tailings should provide more assurance

that toxins, such as mercury and arsenic will remain undisturbed and be prevented from entering the drainage system via subsurface waters.

Destruction of At Risk Species

Despite mitigation efforts and avoidance through design the proposed footprint of the mine site will eliminate habitat of a red-listed lichen and four yellow-listed lichens. The red listed species, *Moelleropsis nebulosa ssp. frullaniae*, is known only to occur in two regions in the world. In Newfoundland, *Moelleropsis* is found in a few locations and Nova Scotia hosts the highest population. The net loss of habitat and biodiversity is deemed to be a residual effect of the project.

The proposed compensation for destroying these species is inadequate. The proponent suggests compensation by doing further surveys because little inventory has been done. This is incorrect, since hundreds of hours of surveys have been conducted over the last 3 years.

- Given that the destruction of species at risk will occur, then land with these species should be secured for protection.

Destruction of Wetlands

The mine footprint will also eliminate wetland habitat. The proponent's claim that the destruction of wetlands will not involve "species of conservation concern", cannot be substantiated without a survey for Sphagnum species. No such survey was conducted for Sphagnum species; moreover, the proponent was advised that wetland 5 could be suitable habitat for S1 species *Sphagnum wulfianum*.

While a proposed engineered wetland is a partial remedy for necessary water filtration it should not be regarded as "like-for-like" compensation for the destruction of natural wetland habitat. It is unlikely an engineered wetland will adequately duplicate the type of wetland that has been destroyed and not enough evidence is provided to determine if the size of a man-made wetland will be enough to accommodate the necessary filtration. Also there is no discussion of disposal of bioaccumulated toxins in plants.

- Given that the destruction of wetlands will occur, then land with these species should be secured for protection.
- Capacity and management of the engineered wetland should be developed further.

Air emissions

Several significant questions remain concerning the impact of air emissions. For example: Why was SO₂ modeled from the pit and not from the plant? How is SO₂ being generated from the pit? What is the SO₂ output from the plant? Why was NO_x not modeled? Why was dust not modeled?

A more specific question is, why was there was no examination of air emissions at peak events when looking at the effects on lichens? The conclusion that dust will not affect lichens is a simply a guess. This section clearly needs more investigation. PAB staff would prefer to see more expert judgement of the impacts of dust on lichens (eg., Dr. David Richardson).

Given this section is incomplete, the assumption remains that the project is a significant threat to rare lichens within the mine area and surrounding landscape. Therefore a monitoring program for rare lichens within the mine area should be established for all the rare species.

- For rare lichens in the surrounding landscape, surveys for endangered boreal felt lichen should be conducted within a 100 km radius of the mine. This includes all boreal felt lichen known to occur or found as a result of the surveys be permanently marked and monitored.

Ecological Monitoring

The proposed monitoring scheme should include ecological/biological surveys. At a minimum there should be a monitoring program for lichens on-site and fish and aquatic invertebrates in the drainage system that receives the effluent. Lichen monitoring should include the health of rare species and metal analysis of common lichens on-site. Monitoring also should include dust analysis, including content analysis, at rare lichen sites as well as in the surrounding landscape.

There is also concern about the rigor and standards of proposed monitoring. The proponent suggests specific timing for parameters such as monthly, quarterly etc. These regimes cannot be considered adequate until a statistical power analysis is done. This approach was undertaken satisfactorily with the Black Bull Project in the Tobeatic region. A thorough effort to collect baseline data has to be done in order to determine natural variation. The data collected so far is not adequate to establish meaningful baseline measurements. The data should include metal analysis of lichens on site and in the surrounding landscape, as well as tissue analysis of aquatic invertebrates and amphibians in Scraggy Lake and the Fish River system.

- Conduct a power analysis on statistical data.
- Collect adequate data to properly determine natural variation.
- Conduct further analysis of lichens on-site and in surrounding areas.
- Establish a Citizen's Liaison Committee and a Technical Committee consisting of scientists, including PAB staff, to review progress in monitoring.

Noise Impacts

While the report provides an assessment of impacts from noise volume, it lacks data on noise quality or the effects of the types of sound. Despite this the Focus Report (p114) concludes: "... noise related impacts will have very little effect if any on the existing

environment adjacent to the project site and in the FRSA". Further, the Focus Report (P. 91, Appendix M) concludes that, "In consideration that there are no nearby residents or commercial facilities, and appropriate mitigation to minimize noise levels to reasonable levels will be made, no significant project-related effects on noise are likely to occur during construction, operation and decommissioning phases...". While this is probably correct, the Terms of Reference for the Focus Report requested DDV Gold to identify potential impacts on wilderness values and not on nearby residents or commercial facilities. Background noise is predicted to be around 42 dBA at the north end of Scraggy Lake. The Focus Report acknowledges (p.114) that "noise level measurements and modeling is very weather and topographically dependent". Typical background levels for wilderness areas are about 35 dBA, therefore, on a still day, background noise from the mine will likely be noticeable in adjacent areas. The most-affected area will be Scraggy Lake, which is a major landmark and an integral component of the regional wilderness recreation opportunity.

The Focus Report (p.17) identifies several noise sources that exceed background operational sounds, such as equipment working on the TMF dam, with levels around 60 dBA at the north shore of Scraggy Lake. Also, blasting noise, which will be heard once a day, five days a week, is characterized as similar to a car door slamming at the north shore of Scraggy Lake (p.17). The Focus Report correctly states that mine-related sound will meet standards outlined in NSEL's Guidelines for Environmental Noise Measurement and Assessment. However, these standards (e.g. ≤ 65 dBA for daytime noise) are "... designed primarily to protect public health and within reasonable economic restraints provide a restful environment in which to live, work and play."

Generally wilderness users tend to seek the experience of solitude and the quiet of nature rather than the industrial sounds emitted from the mine. Table 3.8-1 in the Focus Report ranks impacts on recreational values on a 0 to 3 scale, however it is not clear what methodology was used to determine these rankings. Nevertheless, noise-related Category 2 impacts are identified for the northern part of Scraggy Lake, and category 1 impacts from activities associated with the tailings dam are also predicted for the southern part of Scraggy Lake. In other words - noise from the mine will impact the wilderness recreation values of canoeists, boaters, hikers, fishermen and hunters.

The Focus Report tends to downplay noise-related impacts on wilderness values during the different stages of the operation. It is without doubt that an open pit mine operation will be noisy, with sounds of various types, at various levels, and will penetrate adjacent wilderness areas and affect wilderness experiences and recreational values.

Light Impacts

The Focus Report (p. 111; see also Table 2 of Appendix N) states:

"Background ambient light was not measurable, therefore Project lights will have an impact on the existing environment. However, predicted Project sources in actuality will be well below ILE guidelines at all three sensitive receptors"

Project light impacts are evaluated against the guidelines published by “The Institution of Lighting Engineers (ILE) in the document entitled “Guidance Notes for the Reduction of Obtrusive Light” (<http://www.britastro.org/dark-skies/pdfs/ile.pdf>).

The ILE guideline selected (“E2”) as a standard in the Focus Report is meant to apply to “rural areas, small villages or relatively dark urban locations”. ILE does have a standard for “Intrinsically dark landscapes” such as “National Parks, Areas of Outstanding Natural Beauty...”, which would appear to be more appropriate within the FRSA. Furthermore, ILE states that where a lit area lies on the boundary of two zones, the obtrusive light limitation values should be those applicable to the most rigorous zone. In other words, the Report’s assessment of potential light impacts uses an inappropriate light trespass limit.

Terms of Reference for light-related impacts on recreational value are more closely met by the data provided in Table 3.8-1. The impacts on recreational values are ranked on a 0 to 3 scale. While the criteria and methodology are not clear, it shows that light-related Category 2 impacts, considered as “limited additional impacts from project activities but measurable impacts that *may affect selection of area and experience*,” are identified for the northern part of Scraggy Lake. The results show that light from the tailings dam, waste rock pile and mobile equipment on site will likely impact overnight campers and cottagers. Limited light-related impacts (Category 1) from activities associated with the tailings dam are also predicted for the southern part of Scraggy Lake.

Unlike the noise-related impacts, the Focus Report (p.111) acknowledges that “... Project lights will have an impact”. However, it is not clear that predicted impacts are referenced against wilderness values in a credible manner.

Visual Impacts

The Focus Report has done a relatively good job assessing visual impacts, which hopefully will raise the bar for subsequent mining-related projects. The Report (p. 152) concludes that: “... the waste pile may be visible from very few remote vantage points and may only be in view close to the actual development Given the current conditions, it is expected that the proposed mine development will visually impact less than two percent of the FRSA.”

The Focus Report’s projective mapping (Fig. 4.4-1) is instructive, as it shows the Waste Rock Stockpile (WRSP) will be visible from about 100 Ha of Scraggy Lake and parts of Moose River. The text states that 115 Ha of water can be seen from WRSP, much of which appears to be Scraggy Lake. From extensive open ground adjacent or near to Scraggy Lake, including from some of the large wetlands bordering the lake, from a good proportion of the lake’s shores, and from any open areas on surrounding hills and slopes, including when leaves are off the trees. The WRSP may also be visible from along some slopes bordering Fish River, if not from the river itself, depending on vegetation cover.

Figure 4.4-1 shows that viewers from additional, more remote sites may see the WRSP, depending on vegetation cover. Most of these would offer quite distant views and so would have relatively low visual impact for wilderness users. In other words, Fig. 4.4-1 shows that much of the visual impact of the WRSP would be associated with the Scraggy Lake and Moose River area, with possible impacts along sections of Fish River. Scraggy Lake is a focal point for high-quality wilderness recreation opportunities, which link or are integral with regional opportunities¹. For this reason, most Crown lands around the lake and along Fish River are within the recently announced candidate Ship Harbour Long Lake Wilderness Area.

Table 3.8-1, *Assessment of Recreational Value*, further shows that the tailings dam, WRSP, tailings management facility, processing plant, and site mobile equipment would be visible from the northern part of Scraggy Lake; and that the processing plant and particularly the WRSP would be visible from parts of southern Scraggy Lake. The degree of visual impact is greatest in the area around northern Scraggy Lake.

Notwithstanding this, the Focus Report claims that:

“... the presence of the WRSP will not significantly diminish the wilderness experience of those using the surrounding lands in the FRSA” (p.45), and

“The stockpile at closure will be no higher than the surrounding hills and will be indistinguishable once reforestation is complete” (p.286), and

“... the WRSP will blend into the existing landscape based on its size and shape and plans for revegetation” (p. 23).

However, final crest elevation for the WRSP is proposed to be 166 m above sea level (ASL). As noted in the Focus Report, this compares with the nearest drumlin 500m to the west (mill hill) of 152 m. Other drumlins lying between Scraggy Lake and the proposed WRSP rise to 130 m, 125m and 125 m ASL. The elevation of Scraggy Lake is about 105m ASL. Drumlin crests in the area are generally 20-30 m higher than the surrounding landscape, whereas the final crest elevation of the WRSP stockpile is proposed to rise about 46 m higher than surrounding landscape, or almost twice the height of a typical drumlin in the area.

Preliminary designs show that a broad (about 700 m across), flat-topped structure is planned, rather than a more natural drumlin shape that is more compatible with the surrounding landscape. The proposed WRSP would form a conspicuous, permanent feature, discordant to the surrounding landscape, even if successfully re-forested. This type of structure will be an unsuitable feature for a wilderness area and diminish the

¹ One of the traditional access points for high-water canoe-based travel has been at Moose River at Moose River Gold Mines, and from thence into northern Scraggy Lake; this route is not shown on Fig. 3.8-1, which illustrates backcountry canoe routes. Similarly, this figure does not show the traditional Loon Pond-Egg Lake link between Tangier Grand Lake and Scraggy Lake.

wilderness values of the Scraggy Lake area. This, in turn, would affect the regional wilderness recreation opportunity in the area, as many of these opportunities are linked.

- A final reclamation plan should be based upon sound principles, such as those cited in the DEL's "Guide for Surface Coal Mine Reclamation Plans" (see Appendix 1). The plan should incorporate a landscaping scheme using native seed mixes and a re-forestation plan that will be compatible with or mirror the surrounding area.
- The final shape of the WRSP should be landscaped to a more natural appearance. Further consideration should be given to partially backfilling the pit to reduce the final height of the WRSP. Upon decommissioning, the company may be able to do more to reduce visual impact of the site as a whole, e.g., by fully removing buildings, including obscuring foundations.

Recommendations

Both the EA and the subsequent Focus Report show that despite the thorough and conscientious effort by the consultants for the proponent to design the project to avoid and mitigate environmental effects attributed to the proposed open-pit gold mine, there will be direct and residual impacts on habitat, biodiversity and ecosystems on and off-site. Off-site impacts will occur downstream from the project and within adjacent wilderness areas, including the recently proposed Ship Harbour Long Lake Wilderness Area. Despite the highly regarded record of DDV Gold Ltd, and assurances from world-class consultants in mining engineering and cyanide processing, this project as it is currently designed will result in residual negative effects in the adjacent Ship Harbour-Long Lake Candidate Wilderness Area.

Overall, the environmental effects of the Touquoy Gold Project cannot be fully mitigated. After mitigation the residual impacts include:

- net losses to habitat and biodiversity - including rare species,
- effluents above CCME standards,
- combinations of noise, light and visual impacts,
- elevated risks to aquatic ecosystems, and
- reclamation solutions that are incongruent with adjacent landscapes.

Summary of Recommendations

- All effluent leaving the treatment area should be required to meet CCME guidelines.
- The management plan for containing historic tailings should provide more assurance that toxins, such as mercury and arsenic will remain undisturbed and be prevented from entering the drainage system via subsurface waters.
- Given that the destruction of species at risk will occur, then land with these species should be secured for protection.

- Given that the destruction of wetlands will occur, then land with these species should be secured for protection.
- Capacity and management of the engineered wetland should be developed further.
- For rare lichens in the surrounding landscape, surveys for endangered boreal felt lichen should be conducted within a 100 km radius of the mine. This includes all boreal felt lichen known to occur or found as a result of the surveys be permanently marked and monitored.
- Conduct a power analysis on statistical data.
- Collect adequate data to properly determine natural variation.
- Conduct further analysis of lichens on-site and in surrounding areas.
- Establish a Citizen's Liaison Committee and a Technical Committee consisting of scientists, including PAB staff, to review progress in monitoring.
- A final reclamation plan should be based upon sound principles, such as those cited in the DEL's "Guide for Surface Coal Mine Reclamation Plans" (see Appendix 1). The plan should incorporate a landscaping scheme using native seed mixes and a re-forestation plan that will be compatible with or mirror the surrounding area.
- The final shape of the WRSP should be landscaped to a more natural appearance. Further consideration should be given to partially backfilling the pit to reduce the final height of the WRSP. Upon decommissioning, the company may be able to do more to reduce visual impact of the site as a whole, e.g., by fully removing buildings, including obscuring foundations.
- **A Compensation Option** - We commend the proponent for introducing the notion acquiring conservation land as a form of compensation (p99). If the project is approved, a condition for release should include a plan to establish a **biodiversity off-set**² to mitigate the loss of habitat and biodiversity. This will require the company to secure conservation land that will be given statutory protection. The land will be preferably located in the immediate area and contain habitat suitable to compensate for the destruction of habitat and biodiversity including the loss of rare lichens and wetland. We recommend securement of land with an area no less than the amount of land disturbed (265 ha) with the plan to be completed within a 4 year time frame.

² A Biodiversity Offset is defined as: *A sustainable conservation action intended to compensate for the residual, unavoidable harm to biodiversity caused by development projects, so as to aspire to no net loss in biodiversity. Before developers contemplate offsets, they should have first sought to avoid and minimize harm to biodiversity.* (After ten Kate, Bishop and Bayon, 2004).

References:

“Biodiversity Offsets - A briefing paper for the Mining Industry”. International Council on Mining and Metals, www.icmm.com 25th July 2005. Pp 18.

ten Kate, K., Bishop, J. And Bayon, R (2004). Biodiversity Offsets: Views, experience, and the business case. IUCN, Gland, Switzerland and Cambridge, UK and Insight Investment, London, UK. Pp 95.

Appendix 1

Excerpt from *Guide for Surface Coal Mine Reclamation Plans*, Department of Environment and Labour, 2005.

1.0 PRINCIPLES OF RECLAMATION:

The overall objective of a reclamation plan should be to produce a landscape that is safe, stable and compatible with the surrounding landscape and final land use. Reclamation should also aim to return the land to a self-sustaining and diverse local ecosystem that contributes effectively to the stability of the greater ecosystem in accordance with the final land use. While recognizing that each mine site has unique characteristics, there are principles that are applicable to all surface mining operations. The following principles serve as the foundation for planning and implementing reclamation plans for surface coal mines in Nova Scotia.

Best practices in reclamation planning and management

Mining operations are temporary land use activities and should be conducted with an understanding and respect for the intrinsic value of nature and capacity of the environment. The use of reclamation planning and environmental management that aims for sustainability is encouraged in all aspects of reclamation planning, design and implementation. Plans must be science-based, comprehensive in scope and mitigate against safety hazards and environmental effects. Reclamation, where possible, should be conducted as the operation proceeds using progressive reclamation techniques. After reclamation is completed and the operation closed the site should be self sustaining and/or suitable for an identified or predetermined future land use.

Applied principles of ecological restoration

A central purpose in reclamation planning should be to promote the ecological integrity of each site and surrounding landscapes. The application of ecological restoration principles requires that plans are developed consistent with regional or landscape level ecological objectives. At the local scale, this involves an examination of surrounding landscapes, in combination with determining predicted successional trends of vegetation communities appropriate to enhance local and regional ecosystems. At the site level, emphasis is placed on reclamation techniques such as land-form replication and planting species that will promote site stability and sustainability. Revegetation should use native species that contribute most to the compatibility of the local ecology.

Compatibility in land use, land cover and landscape design

Surface mining also has the potential to visually impact the natural scenery, the open landscape character and/or the cultural landscape of adjacent lands. Final reclamation plans and designs should ensure that post-mine or sequential land use or land cover objectives are identified, clearly described and compatible with surrounding landscapes. Landscape design and visual impact assessments should be incorporated into the reclamation planning process.

Public consultation and Informed decision-making

Surface coal mining activities may occur within one or more of Nova Scotia's communities and should provide consideration to community priorities, needs and interests. Reclamation projects can provide lasting benefits to local communities and interested stakeholders can provide important information for the plans and decisions that determine reclamation objectives and final land use decisions while respecting landowner prerogatives. Communication and consultation among all parties should be comprehensive, meaningful and timely. Consultation tools can and should include citizen liaison committees and public information sessions.